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EXAMINER	
WILLS, LAWRENCE E	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/623,586	EOM ET AL.	
	Examiner	Art Unit	
	LAWRENCE E. WILLS	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 July 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-12 and 15-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-12 and 15-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3-12, and 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Akiyama (US Patent No. 5,872,635)** in view of **Gragg (Pub. No. US 2002/0186404)** and in further view of **Kim (U.S. Patent No. 6,433,811)**.

With regard to claim 1, 6, 10, and 17, Akiyama'635 teaches an image forming apparatus, comprising an engine mechanism 25 (Figure 1,2A, 2B) to perform a printing operation with respect to print data, a video unit 26 to convert the print data into image data readable by the engine mechanism 25 (Column 3, lines 28-32, an image forming apparatus according to the present invention comprises image forming means for forming an image on a recording medium on the basis of pixel data generated by image processing means for

generating pixel data), and an engine control unit 25a to control the engine mechanism 25 to perform the printing operation with the image data. (The video unit 26 comprises a processor 16 that controls the video unit 26 and the engine control unit 25a.), a main control unit to transmit a print start command to the engine control unit (CPU outputs a print command to an engine unit, column 5, lines 50-55), a system bus to directly connect the engine control unit with the processor (number 24, Fig.1) wherein the video unit comprises a processor (notice Fig. 1, number 26 video unit, comprising a processor) but Akiyama'635 fails to specifically teach a main control unit integrated into a single chip with a processor, and the video unit and the engine control unit are driven by the processor.

Gragg'404 teaches a main control unit (the ASIC can perform conventional control of the print engine, paragraph 0012) integrated into a single chip with a processor(single embedded processor that is programmed, paragraph 0027), wherein the video unit and the engine control unit are driven by the processor (the video-encoding, print engine control and image sequencing control may be performed by a single ASIC, Within the ASIC these functions may be performed by dedicated circuits, by a single embedded processor that is programmed to perform these functions, or by a combination thereof, paragraph 0027).

Having a system of Akiyama'635 reference and then given the well-established teaching of Gragg'404 reference, it would have been obvious to one

having ordinary skill in the art at the time the invention was made to modify the printing system of Akiyama'635 reference to include a single embedded processor as taught by Gragg'404 reference, since the result of the combination would have been predictable and simplified the printing system.

Akiyama'635 and Gragg'404 fails to teach the engine control unit comprises a memory to store state information about the engine mechanism.

Kim'811 teaches an engine control unit that comprises a memory to store state information about the engine mechanism. (Column 5, lines 1-6, An engine controller 206 exchanges various commands with the printer engine CPU 202, transmits address information and transmits bit-map data that are image-processed and stored in the memory 204 to the printer engine CPU 202, and controls the entire operational states, operation start time and power supplying state of the printer engine 203.)

Having a system of Akiyama'635 and Gragg'404 reference and then given the well-established teaching of Kim'811 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the image forming system of Akiyama'635 and Gragg'404 reference to include the storing of state information as taught by Kim'811 reference, since the results of the combination would be predictable and would have increased the capabilities of the printer.

With regard to claim 3, Akiyama'635 (in combination with Gragg'404) teaches an image forming apparatus comprising a bi-directional data bus and a control bus. (Figure 1 shows Video I/F, a bi-directional bus, in addition, Figure 2B shows each signal of the bi-directional bus, and Figure 3 lists each signal).

With regard to claims 4, 8, and 13, Akiyama'635 and Kim'811 fails to teach teaches an image forming apparatus wherein the engine control unit is an application specific integrated circuit.

Gragg'404 teaches an image forming apparatus wherein the engine control unit is an application specific integrated circuit (ASIC).

Having a system of Akiyama'635 and Kim'811 reference and then given the well-established teaching of Gragg'404 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the printing system of Akiyama'635 and Kim'811 reference to include a single embedded processor as taught by Gragg'404 reference, since the result of the combination would have been predictable and simplified the printing system.

With regard to claims 5 and 9, Akiyama'635 (in combination with Gragg'404 and Kim'811) teaches an image forming apparatus, wherein the processor reads the state information stored in the memory to check a state of the engine mechanism, and transmits the image data to the engine control unit

to perform the printing operation. (Column 2, lines 30-37, when 1-byte command information is supplied from the video controller to the engine controller in synchronism with the signal /SCLK, the engine controller sends back 1-byte status information to the video controller. This command information includes two commands, i.e., a status request command for checking the status of the printer engine, and an execution command for instructing the printer to perform some operation.)

With regard to claim 7, Akiyama'635 (in combination with Gragg'404 and Kim'811) teaches an image forming apparatus, wherein the video unit 26 comprises the processor 16. (Figure 1, in addition, column 5, lines 35-39 a controller unit (or printer controller) 26 includes components designated by reference numerals 16 to 24 (to be described below). A CPU 16 receives coded image information (code data) from an external apparatus 27 such as a host computer via an external interface 17 upon execution of a control program stored in a ROM 19.)

With regard to claim 11, Akiyama'635 (in combination with Gragg'404 and Kim'811) teaches an image forming apparatus, wherein the processor 16 is a microprocessor CPU, (Figure 1 describes the processor 16 as a CPU).

With regard to claim 12, Akiyama'635 (in combination with Gragg'404 and Kim'811) teaches an image forming apparatus, wherein the controller is an application specific integrated circuit (ASIC). (Column 12, lines 66-67 thru column 13, line 1, note that the present invention may be applied to either a system constituted by a plurality of devices or an apparatus consisting of a single device.)

With regard to claim 16, Akiyama'635 (in combination with Gragg'404 and Kim'811) teaches an image forming apparatus wherein the controller is integrated into a single chip together with the processor. (Column 12, lines 66-67 thru column 13, line 1 Note that the present invention may be applied to either a system constituted by a plurality of devices or an apparatus consisting of a single device.)

With regard to claim 18, Akiyama'635 (in combination with Gragg'404 and Kim'811) teaches a method comprising: generating print data at a computer and transmitting the print data to the first control unit, the bitmap data being generated in accordance with the transmitted print data. (Column 5, lines 35-50, A CPU 16 receives coded image information (code data) from an external apparatus 27 such as a host computer via an external interface 17 upon execution of a control program stored in a ROM 19. The received code data is input to an image processing unit 20. The image processing unit 20

stores the input code data in a RAM 21, and interprets the code data. The external apparatus 27 such as a host computer can perform various kinds of setting operations for the controller unit 26 via the external interface 17. A RAM 18 is used as registers, and the like. A ROM 22 stores font data corresponding to the values of code data. Font data corresponding to code data are read out from the ROM 22 to convert all received code data into video data consisting of dots, and the converted data are stored in a frame memory 23).

With regard to claim 21, Akiyama'635 (in combination with Gragg'404 and Kim'811) teaches the engine control unit driving the engine mechanism in accordance with control by the processor (notice Fig. 2B).

With regard to claim 22, Akiyama'635 (in combination with Gragg'404 and Kim'811) teaches the transmitted image data is transmitted via the bus without processing by the bus (As seen in Fig. 3, the video I/F, 24, only transfers signals and data. No processing is done by the video I/F.).

4. **Claim 15, 19, and 20** are rejected under 35 USC 103(a) as being unpatentable over **Akiyama'635 (U.S. Patent No. 5,872,635)** in view of **Gragg (Pub. No. US 2002/0186404)** and in further view of **Kim (U.S. Patent No. 6,433,811)** as applied to claims 10 and 17 above and in further view of **Lee (U.S. Patent No. 5,737,602).**

With regard to claim 15, Akiyama'635 (in combination with Gragg'404 and Kim'811) teaches an image forming apparatus comprising a bi-directional data bus and a control bus. (Figure 1 shows Video I/F, a bi-directional bus, in addition, Figure 2B shows each signal of the bi-directional bus, and Figure 3 lists each signal) but Akiyama'635 and Gragg'404 do not specifically teach a horizontal synchronization (HSYNC) signal, a page synchronization signal request signal and a page synchronization (PSYNC) signal.

Lee'602 teaches a control bus to input and output a horizontal synchronization (HSYNC) signal, a page synchronization signal request signal and a page synchronization (PSYNC) signal. (Figure 3 shows HSYNC, PSYNC, and PSYNCRQ)

Having a system of Akiyama'635 and Gragg'404 and Kim'811 reference and then given the well-established teaching of Lee'602 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the image forming system of Akiyama'635 and Gragg'404 and Kim'811 reference to include synchronization signals as taught by Lee'602 reference, since the result of the combination would be predictable and would have increased the reliability of the system.

With regard to claim 19, Akiyama'635 (in combination with Gragg'404 and Kim'811) teaches a method related to generating print data. (Explained in

claim 18 rejection above) but Akiyama'635 and Gragg'404 and Kim'811 do not specifically teach a method further comprising: sending notification to the second control unit when the generating the bitmap data is complete; driving the printing engine in response to the sending of the notification; generating a horizontal sync (HSYNC) signal at the printing engine in response to the driving of the printing engine; and transmitting the HSYNC signal from the second control unit to the first control unit.

Lee'602 teaches sending notification to the second control unit when the generating the bitmap data is complete; driving the printing engine in response to the sending of the notification; generating a horizontal sync (HSYNC) signal at the printing engine in response to the driving of the printing engine; and transmitting the HSYNC signal from the second control unit to the first control unit. (Column 3, lines 41-60 First, when engine unit 200 is prepared to operate, engine controller 220 outputs a ready signal RDY to inform controller 120 of this condition. After the ready signal RDY is provided to controller 120, controller 120 provides a print command signal PRINT to engine controller 220. In response to the print command signal PRINT, engine controller 220 drives a motor (not shown), picks up the paper, moves the paper to a position where printing can occur, and provides a page synchronous request signal PSYNCRQ to controller 120. After the page synchronous request signal PSYNCRQ is provided to controller 120, controller 120 outputs a page synchronous signal PSYNC to engine controller 220. At this time, controller 120 transmits line

data having the bit map data format corresponding to one scan line to engine controller 220 in synchronism with a horizontal synchronous signal HSYNC which is periodically generated by engine controller 220. Then, after receiving the line data, engine controller 220 enables printing of the data on paper.)

Having a system of Akiyama'635 and Gragg'404 and Kim'811 reference and then given the well-established teaching of Lee'602 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the image forming system of Akiyama'635 and Gragg'404 and Kim'811 reference to include synchronization signals as taught by Lee'602 reference, since the result of the combination would be predictable and would have increased the reliability of the system.

With regard to claim 20, Akiyama'635 and Gragg'404 teach a method related to generating print data. (Explained in claim 18 and 19 rejections above) but Akiyama'635 and Gragg'404 and Kim'811 does not specifically teach determining that an RPM of a motor of the printing engine has reached a predetermined value; transmitting a page sync (PSYNC) request signal from the first control unit to the second control unit in response to the transmitting of the HSYNC signal and the determining of the RPM; feeding a paper for printing when the second control unit receives the PSYNC request signal; and transmitting a PSYNC signal from the second control unit to the first control unit when a sensor of the printing engine senses the fed paper. (Column 1,

lines 26-29 the speed of a driving motor in an engine unit remains constant and a period of the horizontal synchronous signal HSYNC for receiving the data of the one scan line is also constant and Column 3, lines 41-60 First, when engine unit 200 is prepared to operate, engine controller 220 outputs a ready signal RDY to inform controller 120 of this condition. After the ready signal RDY is provided to controller 120, controller 120 provides a print command signal PRINT to engine controller 220. In response to the print command signal PRINT, engine controller 220 drives a motor (not shown), picks up the paper, moves the paper to a position where printing can occur, and provides a page synchronous request signal PSYNCRQ to controller 120. After the page synchronous request signal PSYNCRQ is provided to controller 120, controller 120 outputs a page synchronous signal PSYNC to engine controller 220. At this time, controller 120 transmits line data having the bit map data format corresponding to one scan line to engine controller 220 in synchronism with a horizontal synchronous signal HSYNC which is periodically generated by engine controller 220. Then, after receiving the line data, engine controller 220 enables printing of the data on paper.)

Having a system of Akiyama'635 and Gragg'404 and Kim'811 reference and then given the well-established teaching of Lee'602 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the image forming system of Akiyama'635 and Gragg'404 and Kim'811 reference to include synchronization signals as taught by Lee'602

reference, since the result of the combination would be predictable and would have increased the reliability of the system.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAWRENCE E. WILLS whose telephone number is (571)270-3145. The examiner can normally be reached on Monday-Friday 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, King Poon can be reached on 571-272-7440. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/King Y. Poon/
Supervisory Patent Examiner, Art Unit 2625

LEW
October 21, 2009